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The greatest stimulus to exercise of the brain is human society. Hence the greatest developments of mind have always been in the centers of population. Whatever may be the passive virtues of country life, it is the cities that furnish both the stimulus and the field for the triumphs of mind.

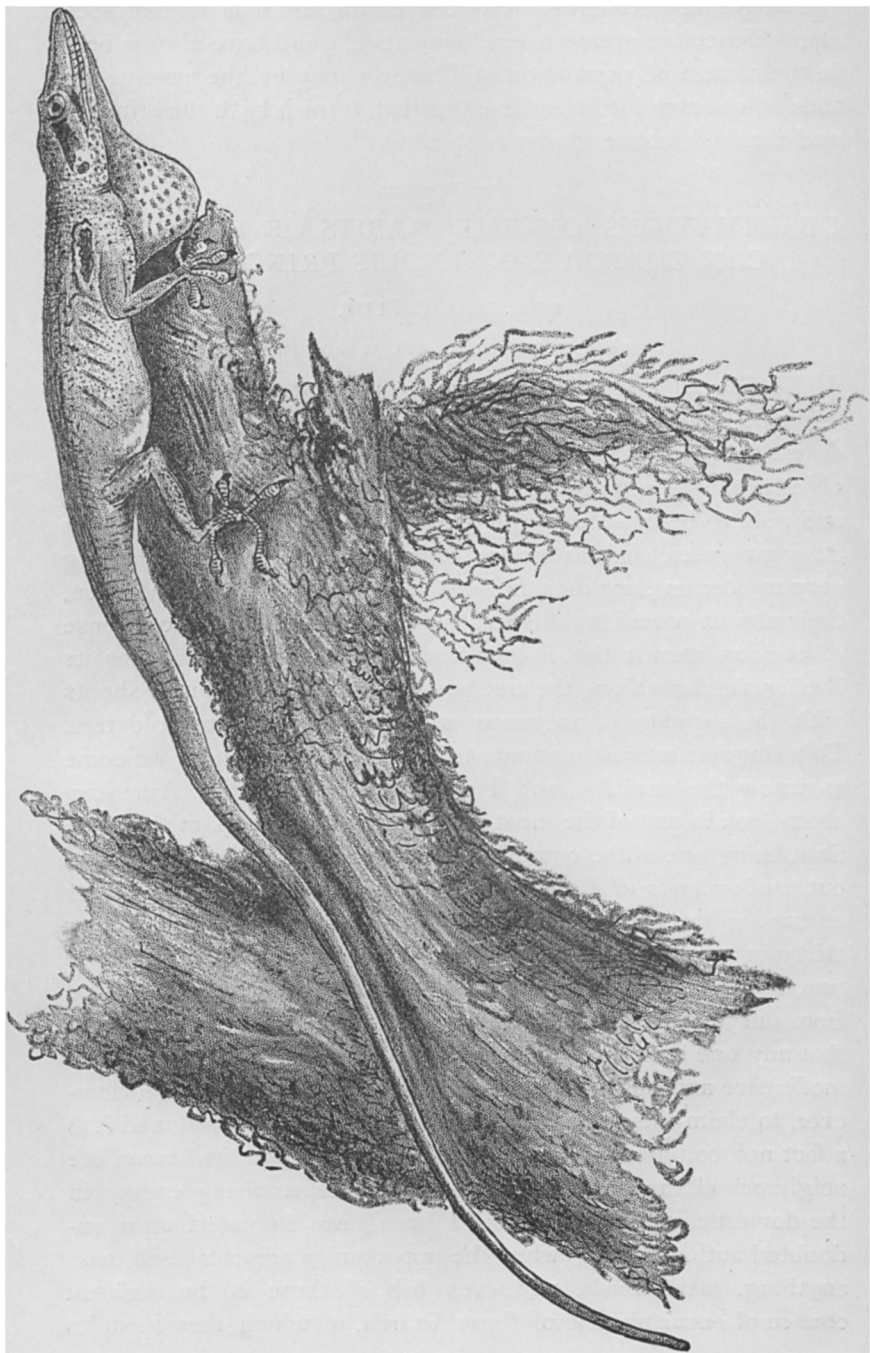
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OBSERVATIONS ON THE HABITS OF THE AMERICAN CHAMELEON (*ANOLIS PRINCIPALIS*).

BY R. W. SHUFELDT,

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UNDER all circumstances lizards are interesting creatures; meet them where we may; as one evidence of this, how often do we find them chosen, and that, too, for many ages gone by, as objects to adorn pottery, vases and china, or modeled in silver and gold to be worn as jewelry, or cast in the baser metals for other purposes, such as bronze ornaments. There is something very mysterious, at times, in their very look, their dignified mien, their almost provoking silence; this is changed in us to a sense of curious interest that is quickened as the reptile assumes its livelier air, darts along the tree branch that it may be on, or shoots with the rapidity of an arrow up the trunk of some old tree. This singular interest amounts to positive fascination, as we come to know the anolidæ, and I assure you our little American chameleon is one of the most engaging of the group, at the same time, being one of the commonest of all the lizards found throughout the lowlands of Louisiana; indeed, I have known instances of two or three children capturing as many as twenty-five or thirty in some old magnolia grove in the course of an hour or two, and we may well imagine the number that would escape from our juvenile collectors. It is certainly the exception though, that any one ever disturbs or injures, either in city or forest, this inoffensive and harmless little creature; entitled as we are, however, to claim this for ourselves, it must be remembered, and it is a fact not commonly known, that in the town and its immediate neighborhood the chameleon has an uncompromising enemy in the domestic cat. This animal, I have been informed upon undoubted authority, will, when the opportunity presents itself, pass anything, meat, birds, and even fish, if there is the slightest chance of securing one of these lizards, of which they seem to



Anolis principalis; life size; from nature, by R. W. Shufeldt, U.S.A.

be so inordinately fond. The cat will stalk one, just as we all have seen them attack some unsuspecting sparrow. Should the lizard be on the trunk of a tree, and low down near the ground, and the cat miss it in her spring, she will frequently, in her disappointment, chase it up the tree, where of course the reptile wins in such an unequal race.

In the forest, *Anolis*, no doubt, has many another animal foe that makes it its prey. Our smaller hawks often seize and devour them, when they appear, and are exposed in the open.

In addition to this, the chameleon is subject to other accidents; its long tail is frequently broken off; this may grow out again as it does in *Ophisaurus*, though I have in my possession a specimen where this extremity healed over instead. Another specimen in my collection, has some time or other, apparently long anterior to capture, lost a foot, in this case a very pretty little stump has resulted, leaving a member of considerable use.

I have, perched up before me, one of these little fellows, that was taken for my special benefit several days ago; the reader is presented with a very careful and accurately measured drawing that I have made of him. They sometimes attain a length to exceed this one, by two or three centimeters, rarely more. His entire form is covered with the most delicate and minute scales, which are found to be larger along the borders of the jaws and top of the head, where they are regularly arranged. The nostrils are seen within the rounded border of the snout above, and the bright, black little eyes peep out through longitudinal slits forming the eyelids, the latter being at the base of rather sunken orbits. The oral gape is capacious, and the aperture leading to the internal ear is found a few millimeters to the rear of its commissure. In some specimens a jet black patch is found between the eye and ear, and another above the forearm on the side, surrounded by a whitish border; one or both of these markings may be absent, the anterior one being by far the most persistent. During deep inspiration eight ribs may be counted on either side of this lizard's body; these rarely show when the specimen is at rest and in good condition. See what peculiar feet he has, particularly the hinder pair, and I have taken unusual pains to represent these correctly, and to the best advantage. The fore feet are arranged quite symmetrically, but the toes on the rear pair can be spread out as shown in the cut, or drawn down, side by

side, to form a very narrow, and we must own, much more slightly foot. Lying in the median plane, beneath the throat and reaching back as far as the sternal space, *Anolis* possesses a peculiar ornament; this consists in a fold of the common integument, controlled by an exceedingly interesting apparatus that gives it the power of protruding downwards and slightly forwards at will, carrying the fold with it, to fully the extent shown in the figure, or even more. Upon complete retraction this appendage is scarcely discernible. Its sudden appearance has a very striking effect, as the skin of which it is composed is of a bright red color, being decked over with the white scales, which are here larger than usually found elsewhere on the body, that stand apart by the stretching. Out of the large number of specimens that I have examined alive, this curious affair never appeared to be missing, though in some it was very much more prominent than in others, so we are forced not to attach to it any sexual distinction. The males are crested, also, along the dorsum, another feature which becomes more prominent when this reptile is excited. Under nearly all conditions the ventral parts of *Anolis*, except the continuity of the tail, are white, longitudinally striped with irregular dusky lines that are much more decided at the throat, and almost amount to a mottling on the belly and chest. A certain amount of mottling occurs high up and along the back. This lizard can assume, apparently at will, one of two colors, or an irregularly distributed combination of both of them; these colors are a bright pea-green, the alternative being a very handsome shade of brownish-bronze, very dark in some old specimens, very light in others.

The first time he comes under your observation he may be descending the trunk of some old cypress; you pause and cautiously approach him; he gradually slows down his advance to a deliberate walk, then stops, slowly raises the fore part of his body, turns his head to one side, and surveys you with a peculiarly knowing gaze, and perhaps even coldly winks once or twice, at long intervals. While this performance is going on his entire body becomes a dead brownish-bronze, ever and anon imperceptibly flushing a lighter tint. You make a step nearer, and he suddenly wheels and heads his course up the trunk, squatting very low as he does so; you come still a little nearer, and he advances up the tree in a spiral direction, until he is on the opposite

side of the trunk and out of your sight. At this moment perhaps the thought seizes you to effect his capture, and you spring forward to head him off; but in his cunning he has outgeneraled you, he is nowhere to be seen on the sides of the rugged old trunk; so for a more general inspection, you back away a few steps, when, to your surprise, far above your head you behold him stretched out along the first horizontal limb that extends from the main trunk. Who would believe it though; who would take him for the same nimble little fellow that had just escaped us! He is now almost completely clothed in a complete suit of bright green, his crimson gular pouch protruding and retracting, reminding one of the opening and shutting of some tropical butterfly in the noon-day sun. At other times, when the surrounding circumstances seemed to demand it, he would have donned a coat made up of irregular patches of the two colors, with their various shades, at his command. This power of protective mimicry on the part of *Anolis*, for as an example of this we must certainly regard it, serves him best when he resorts, which he frequently does, to the bright green stalks of certain fresh-water reeds and plants that are found growing luxuriantly about the bayous and canals of his native haunts. It was in some such locality as this, that, the other day, I observed one of the prettiest examples of this very same protective resemblance, that one would care to witness, almost equal to that famous butterfly that Wallace so admirably figures in his work upon the Malay Archipelago, now so familiar to all of us.

I had just scrambled over one of these so-called canals, that divided, by the aid of an old fence, an extensive marshy tract from a deserted field; this field was overgrown, in addition to various other kinds of undergrowth, with a tall, bright green, ribbon-like grass. As I pushed my way into this, a shower of grasshoppers arose, making off in every direction; by accident, however, I discovered that two species did not resort to this mode of escape. One of these was of a shade of green that nearly matched the grass in question, the other, larger, was about the shade of the grass after it was dead and dried by the sun. They both had about the same form; the head was long and pointed in front, its apparent length increased by the insect bringing its antennæ together and sticking them out straight forward. Behind, the wrinkled wings trailed out to a sharp point, like the pointed ex-

tremities of the grass blades, and the heavy pair of limbs that spring from the metathorax were long and slender, so as to assist it in the deception. These insects, upon being alarmed, instead of taking to flight as the other varieties did, simply, and with marked deliberation, shuffled down *backwards* to the pointed end of one of the leaves upon which it was resting at the time, and quietly hung there, where it demanded a pretty sharp pair of eyes to detect them, particularly if a breeze kept the grass in motion at the time.

Chameleons placed in alcohol for preservation, change in all manner of ways; the larger share of the green usually disappears, the under parts often become so mottled as to mask the white entirely; it commonly brings out in strong relief the longitudinal stripes on the gular space; the mottling on the upper parts, is likewise made far more evident than in the living reptile. The iris of *Anolis*, during life is of a bright hazel, with a perfectly round pupil. When taken in the hand, they generally throw the jaws far apart and viciously seize any part of that member, that may come within their reach. The bite of the larger specimens is quite a severe little nip, but I have never seen a case where their delicate teeth could inflict a wound of sufficient depth, so as to bring the blood. They will hang on for a long time, longer usually than our patience will hold out, and it generally results in our detaching them by the free hand. No doubt, as trifling as this bite may be, it often saves the life of our chameleon, as the unsuspecting, or children who pick them up out of curiosity's sake, upon being suddenly pinched in that way, are very apt to involuntarily wring the hand until the lizard looses its hold and promptly makes its escape in the grass or elsewhere.

During the morning hours, among the trees, the chameleons are rarely seen, but as the sun approaches the zenith, and the recesses of the forest begin to be thoroughly warmed, these little fellows may be observed descending the trunks of the trees to engage in their favorite hunting expeditions, about the gnarled roots that are exposed above the ground at their bases. Here they capture all manner of insects which constitute their food, and it is during these feeding times that we have the opportunity to behold some of their quaintest movements. I was so fortunate, not long ago, to catch one in the act, the instant after he had made a successful spring upon rather a large butterfly. The body

of the insect was in his mouth, while the wings were violently flapping at the side of the lizard's face. The reptile would clinch his jaws together spasmodically two or three times, shutting his eyes with a very tight squeeze each time he did so. At last his prey was silent, when with a few energetic kicks he tore off the creature's wings, and disposed of his body *sans cérémonie*.

Anolis principalis no doubt renders, by its constant destruction of those insects which infest the trees of our Southern cities, a great service, and that, too, in a very modest and unassuming way. In this respect how much better they are than that miserable and noisy little foreigner, the so-called English sparrow, that we have taken so much pains to introduce and foster; a bird now found in every city of our Union, from Boston to New Orleans, in alarming numbers; I say alarming, because I know, full well, as every ornithologist in the land knows, that the day is sure to come when we shall have seen enough of his dappled brown coat, so constantly and impertinently intruded upon us, at the expense of our own avian favorites, and we shall learn to regard him, perhaps only when it is too late, as one of the agricultural pests of the United States.

The season approaches when Louisiana, recovering from the temporary shock caused by her mock winter, again puts forth the natural jewels of her animal and vegetable kingdoms, again presents us with fresh flowers and fresh fields, after so short a relapse. Birds once more stream northward, mammals throw off their semi-torpidity and resume their usual avocations. In the overflowed bayous, rendered almost unendurable by an atmosphere charged with all the aromatic odors of a budding Southern spring, we at this time, too, see the gaudy representatives of the reptilian world gradually make their several appearances. Frogs croak, Hylas peep, and in some sunny nook the deadly moccasin warms his snuff-brown coils, alone, dreaded and shunned. All rejoice that this happy season once more opens, and the feeble grasp of the winter god is withdrawn. Where is *Anolis* now? we have not far to go, indeed, to find our bi-colored masquerader; see the emerald-clad scamp as he eyes you from the brawny limb of the pecan, under which you stand. But what is he up to! You quietly watch him, and his employment seems to be of such a nature that he soon completely ignores you, and proceeds with it at all risks, and at all costs. The mystery is soon solved, and we

can readily appreciate this agitation, this bowing and strutting, and all manner of quaint motions, as if the very last drop of his quaint lacertilian blood was on fire—for coyishly, and with all due deference, reclines before his lordship, his chosen mate, exerting all her chameleonic powers to hide her blushes by vain endeavors to match the colored pattern of her couch, with all the bronzes and browns at her command. He can withstand her charms no longer, and for the moment, laying aside all dignity, and the object of his affections not unwillingly submitting, in the next instant finds herself in the passionate embraces of her lord, who, to make sure that he has actually won his coveted prize, winds about her lithe form, perhaps in some mystic love-knot, his entire caudal extremity, and blinds her eyes, first on one side and then on the other, by the extension of the flaming ornament at his throat.

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THE VARIABILITY OF PROTOPLASM.

BY CHARLES MORRIS.

ARE the other planets inhabitable, or is life confined to our earth? This is a question which has been widely debated with various conclusions. It is not probable and hardly possible that the surface conditions and temperature of any other planet of the solar system closely resemble those of the earth. Elsewhere in the universe may be very many planets approaching the earth in condition, and on which life may exist. But as regards the planets of our system the question at issue has hitherto been whether their surface temperature might or might not be near that of the earth. If the former they might sustain life. If the latter it was held that they must be lifeless.

But to say that life can only exist under conditions similar to those with which we are familiar is to make a bold assertion. It is presumptuous to take this little earth as the measuring rod of the universe. Life upon the earth arises from the activity of protoplasm, a highly complex organic compound. It is tacitly assumed that life everywhere must arise from the activity of protoplasm, and that protoplasm can only exist under conditions like those to which we are accustomed. This assumption cannot yet be disproved, but it may be questioned. There are some